

Claims:

1. A method for use during the ultrasonic treatment of a cancer in subject tissue, comprising the step of:

robotically manipulating an array of two or more ultrasonic treatment probes, that are mechanically focused onto a con-focal region, to sight said focal region on at least a portion of a target tumour whose site is determined by ultrasound.

2. A method as claimed in claim 1, comprising the further step of manipulating the array to sight on one or more other focal regions of said target tumour.

3. A method or claimed in claim 2, wherein said manipulations are performed as a series of step-wise motions in one plane.

4. A method as claimed in any one of the preceding claims, comprising the further step of determining the site of the target tumour by ultrasound, prior to the step of robotically manipulating an array.

5. A method or claimed in claim 4, wherein the step of determining the site of a target tumour includes:

ultrasonically scanning at least a portion of subject tissue in a series of step-wise slices to derive a pseudo three-dimensional representation thereof.

6. A method as claimed in any one of the preceding claims, comprising the further step, preceding the step of robotically manipulating an array, of mechanically configuring said array of probes to give a desired convergent con-focal region.

7. A method as claimed in any one of the preceding claims, comprising the further step, following the step of robotically manipulating an array, of activating said probes to ablate said portion of the target tumour.

8. A method as claimed in claim 7, wherein said activating step is performed with predetermined probe parameters, determining the thermal dose.
9. A method as claimed in claim 8, wherein said parameters include one or more of frequency, power and on-time.
10. A method as claimed in any one of the preceding claims, comprising the further initial steps of defining a safe working envelope for said robotic manipulation step.
11. A method as claimed in claim 10 when dependent on at least claim 7, wherein said robotic manipulation is interlocked with said activation such that both steps cannot occur simultaneously.
12. A method as claimed in any one of the previous claims comprising the further, initial step of locating and orientating the array and a patient relative to each other, such that said target tumour site is within the range of motion of said array.
13. A method as claimed in claim 12, restricted to treatment of cancers in the breast.
14. Apparatus for the ultrasonic treatment of cancer in subject tissue, comprising:
 - an array of (i) two or more ultrasonic treatment probes, that are mechanically configurable to be focused onto a desired con-focal region, and (ii) an ultrasonic identification probe;
 - a robotic manipulator, carrying said array, and operable to move said array and thus sight said focal region; and
 - a programmed controller which operates to activate said probes and said cause motion of robotic manipulator in a manner such that the identification probe is scanned over at least a portion of the tissue to determine the site of a target tumour, and the treatment probes are sighted such that the focal region coincides with at least a portion of the target tumour and are activated to ablate said portion of the target tumour.

15. The apparatus of claim 14, wherein said controller activates said robotic manipulator to sight and operate the treatment probes at other focal regions coinciding with the target tumour.

16. Apparatus as claimed in claim 15, wherein said controller activates said robotic manipulator as a series of step-wise motions in one plane to sight and operate the treatment probes in aggregation to coincide with the target tumour in that plane.

17. Apparatus as claimed in any one of claims 14 to 16, wherein said robotic manipulator operates to cause the identification probe to scan at least a portion of the subject tissue as a series of step-wise slices to derive a pseudo three-dimensional representation thereof.

18. Apparatus as claimed in any one of claims 14 to 17, wherein said array of probes is mechanically configured to give a desired focal region matching to the determined site of the tumour.

19. Apparatus as claimed in claim 18, wherein said ultrasonic treatment probes have predetermined parameters determining the thermal dose.

20. Apparatus as claimed in any one of claims 14 to 19, further comprising a procedure table upon which a subject can lie, having an acoustic window therein at which said subject tissue is sited.

21. Apparatus as claimed in claim 20, wherein the acoustic window is arranged to be aligned with the breast of a subject.

22. Apparatus as claimed in any one of the claims 14 to 21, wherein said controller is programmed to define a safe working envelope for the array.

23. Apparatus as claimed in claim 22, wherein said controller further interlocks said treatment probes and said robotic manipulator so that neither can be operated simultaneously.
24. A jig array assembly for ultrasonic treatment probes comprising:
a central shaft;
two or more segmented collars, in a stacked manner rotatably of said shaft, and adapted to be fixed in a chosen orientation by fastening means;
a respective mounting member extending from each said collar, and providing mounting point, said mounting point lying in a common plane orthogonal to said shaft;
a respective arm attached at the end to a respective mounting point; and
a respective probe holder attached to the other end of each said arm.
25. An assembly as claimed in claim 24, wherein said arm are of chosen lengths.
26. An assembly as claimed in either one of claim 24 or claim 25, further comprising an identification ultrasonic probe mounting point located at an end of the shaft.